

## **REMARKS**

### **I. General Remarks and Disposition of the Claims**

Please consider the application in view of the following remarks. Applicants thank the Examiner for his careful consideration of this application, including the references that Applicants have submitted in this case.

At the time of the Final Office Action, claims 1-12 and 25-32 were pending in this application. Claims 1-11 and 25-32 stand rejected. Claim 12 has been withdrawn from consideration. By this paper, claims 1, 2, 4, 6, and 32 have been amended herein, claim 3 has been canceled, and claim 33 has been added. These amendments are supported by the specification as filed. All the amendments are made in a good faith effort to advance the prosecution on the merits of this case. It should not be assumed that the amendments made herein were made for reasons related to patentability. Applicants respectfully request that the above amendments be entered and further request reconsideration in light of the amendments and remarks contained herein.

### **II. Remarks Regarding Rejections Under 35 U.S.C. § 102/103**

Claims 1, 3-11, and 25-32 stand rejected under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative under 35 U.S.C. § 103(a) as being obvious over, U.S. Patent No. 5,366,643 issued to Walker (hereinafter "*Walker*"). With respect to this rejection, the Final Office Action states:

With respect to claims 1 and 32, Walker discloses a method of inhibiting corrosion of a metal surface contacted by an aqueous acid solution comprising: combining a corrosion inhibiting composition with the aqueous acid solution and contacting the metal surface, such as a metal surface in a subterranean formation, with the aqueous acid solution containing the corrosion inhibiting composition (see col. 1, lines 15-20). The corrosion inhibiting composition comprises the reaction product of an alpha,beta-unsaturated aldehyde with a primary or secondary amine (see col. 2, lines 30-67; see examples I-IV). Walker further discloses that the materials used to form the reaction product may be added in any order to the reaction vessel (see col. 9, lines 10-23). Therefore, the alpha,beta-unsaturated aldehyde and the primary or secondary amine may be added first thus reacting to form an imine. In the event that a reaction product comprising an imine has not been shown with sufficient specificity in the disclosure of Walker, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to form a reaction product by first adding the aldehyde and ethanolamine disclosed by Walker (see example I) to the reaction vessel first, thus forming an imine, prior to adding the rest of the materials as shown in example I, since Walker discloses that the materials may be added in any order to the reaction vessel.

With respect to claim 3, Walker discloses that the metal surface comprises N-80 steel (see examples I-IV).

With respect to claim 4, Walker discloses that the alpha,beta-unsaturated aldehyde comprises cinnamaldehyde (see col. 5, lines 57-66).

With respect to claim 5, Walker discloses that the primary or secondary amine comprises ethanolamine (see table III).

With respect to claim 6, Walker discloses that the reaction product results from a reaction of the primary or secondary amine with the alpha,beta-unsaturated aldehyde at a molar ratio of amine to aldehyde or ketone in the range of from about 0.1:1 to about 4:1. Specifically, Walker discloses 0.3 moles of ethanolamine and 0.66 moles of an aldehyde which fall within the claimed ratio (see example I and tables I-V).

With respect to claim 7, Walker discloses that the corrosion inhibiting composition is combined with the aqueous acid solution in an amount in the range of from about 0.01% to about 5% by weight of the aqueous acid fluid. Specifically, Walker discloses that the inhibitor composition is present in an amount from about 1 to about 20 gallons per 1000 gallons of aqueous acidic solution which falls within the claim range (see col. 8, lines 20-35).

With respect to claim 8, Walker discloses that the corrosion inhibiting composition further comprises a solvent or a surfactant (see col. 7, lines 40-60).

With respect to claims 9 and 10, Walker discloses that the aqueous acid solution is 15% hydrochloric acid. It is well known that a 15% solution of hydrochloric acid means that the solution is 15% hydrochloric acid and the remainder is water (see examples 1-IV).

With respect to claims 11 and 25, Walker discloses in the examples that the metal coupon is exposed to the aqueous acid solution at temperatures of about 300°F, wherein the hydrochloric acid is at a concentration of about 15% by weight of the solution (see example I; see column 9).

With respect to claims 26-31, Walker discloses that the corrosion inhibiting composition may further comprise acetylenic

alcohol (see col. 7, lines 1-24), carbonyl compounds (see col. 5, lines 10-25), and formamide (see table IV)

The Applicant argues that the corrosion inhibiting compositions of Walker are reaction products of at least four different reactants that will form different reaction products than required by the present claims (a reaction product that comprises an imine, a hemiaminal, an iminium ion, or combinations thereof).

The examiner respectfully disagrees. Walker discloses that the reactants may be added in any order to the reaction vessel (see col. 9, lines 20-23; example 1). Therefore, the aldehyde or ketone may be added first prior to the addition of the amine. Then when the amine is added the ingredients will react and form an imine prior to addition of the remaining reactants. Thus the reaction product comprises an imine when the disclosed aldehyde and ethanolamine are used as the reactants.

In addition, the newly cited prior art reference to Treybig et al. clearly discloses the formation of a reaction product that comprises an imine by reacting an unsaturated aldehyde with a primary amine to form an imine (see col. 2, lines 35-47; see col. 5, lines 3-51 ).

(Final Office Action at 2-4.) Applicants respectfully disagree. Applicants submit that *Walker* fails to disclose, teach, or suggest every element as recited in claims 1 and 32, as amended, as required to anticipate these claims under 35 U.S.C. § 102(b) or to obviate these claims under 35 U.S.C. § 103(a). MPEP § 2131, 2142.

With respect to independent claims 1 and 32, *Walker* fails to disclose a “corrosion inhibiting composition comprising a reaction product of an alpha,beta-unsaturated ketone with a primary or secondary amine” or a corrosion inhibiting composition that comprises “a reaction product of an alpha,beta-unsaturated aldehyde or an alpha,beta-unsaturated ketone with a primary or secondary amine, wherein the alpha,beta-unsaturated aldehyde comprises at least one aldehyde selected from the group consisting of: crotonaldehyde, 2-hexenal, 2-heptenal, 2-octenal, 2-nonenal, 2-decenal, 2-undecenal, 2-dodecenal, 2,4-hexadienal, 2,4-heptadienal, 2,4-octadienal, 2,4-nonadienal, 2,4-decadienal, 2,4-undecadienal, 2,4-dodecadienal, 2,6-dodecadienal, citral, 1-formyl-[2-(2-methylvinyl)]-2-n-octylethylene, dicinnamaldehyde, p-hydroxycinnamaldehyde, p-methylcinnamaldehyde, p-ethylcinnamaldehyde, p-methoxycinnamaldehyde, p-dimethylaminocinnamaldehyde, p-diethylaminocinnamaldehyde, p-nitrocinnamaldehyde, o-nitrocinnamaldehyde, o-allyloxycinnamaldehyde, 4-(3-propenal)cinnamaldehyde, p-sodium sulfocinnamaldehyde, p-

trimethylammoniumcinnamaldehyde sulfate, p-trimethylammoniumcinnamaldehyde o-methylsulfate, p-thiocyanocinnamaldehyde, p-(S-acetyl)thiocinnamaldehyde, p-(S-N,N-dimethylcarbamoylthio)cinnamaldehyde, p-chlorocinnamaldehyde, 5-phenyl-2,4-pentadienal, 7-phenyl-2,4,6-heptatrienal, 5-(p-methoxyphenyl)-2,4-pentadienal, 2,3-diphenylacrolein, 3,3-diphenylacrolein,  $\alpha$ -methylcinnamaldehyde,  $\beta$ -methylcinnamaldehyde,  $\alpha$ -chlorocinnamaldehyde,  $\alpha$ -bromocinnamaldehyde,  $\alpha$ -butylcinnamaldehyde,  $\alpha$ -amylcinnamaldehyde,  $\alpha$ -hexylcinnamaldehyde, 2-(p-methylbenzylidene)decanal,  $\alpha$ -bromo-p-cyanocinnamaldehyde,  $\alpha$ -ethyl-p-methylcinnamaldehyde, p-methyl-  $\alpha$ -pentylcinnamaldehyde, 3,4-dimethoxy- $\alpha$ -methylcinnamaldehyde,  $\alpha$ -[(4-methylphenyl)methylene]benzeneacetaldehyde,  $\alpha$ -(hydroxymethylene)-4-methylbenzylacetaldehyde, 4-chloro- $\alpha$ -(hydroxymethylene)benzeneacetaldehyde,  $\alpha$ -nonylidenebenzeneacetaldehyde, 3,7-dimethyl-2,6-octadienal, and a beta-hydroxy aldehyde which dehydrates to form an alpha,beta-unsaturated aldehyde under acidic conditions.” Rather, *Walker* fails to disclose a reaction product of an alpha,beta-unsaturated ketone or alpha,beta-unsaturated aldehyde from the claimed group. See *Walker*, entire disclosure.

Therefore, Applicants respectfully assert that independent claims 1 and 32 and their dependent claims are not anticipated by *Walker*. Nor would it be obvious to modify *Walker* to teach these limitations. Thus, Applicants respectfully assert that independent claims 1 and 32 and their dependent claims are not obviated by *Walker*. Accordingly, Applicants respectfully request withdrawal of this rejection with respect to claims 1, 4-11, and 26-32.

### III. Remarks Regarding Rejections Under 35 U.S.C. § 103(a)

Claim 2 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Walker* in view of U.S. Patent No. 4,784,796 issued to Treybig *et al.* (hereinafter “*Treybig*”). With respect to this rejection, the Final Office Action states:

*Walker* discloses the claimed invention except for the step of separately adding the aldehyde or ketone and the amine to water used to from the aqueous acid solution.

*Treybig et al.* disclose a process of forming a corrosion inhibitor by first reacting an alpha,beta-unsaturated aldehyde with a primary amine to form an imine (see col. 2, lines 35-47; see col. 5, lines 17-51). *Treybig et al.* further discloses that the amine is first dissolved in a suitable solvent in a reaction vessel. The solvent being water is mixed with the amine. Then a solution of unsaturated aldehyde is contacted with the amine solution (see col.

5, lines 3-28). This reaction results in the formation of an imine which is suitable for use as a corrosion inhibitor (see col. 5, lines 38-42).

Therefore, because both Walker and Treybig et al. teach a process for forming a corrosion inhibiting composition suitable for preventing corrosion of metals in oil well materials, it would have been obvious to one skilled in the art to substitute one process of forming the corrosion inhibiting composition for the other to achieve the predictable result of preventing corrosion of metals in oil well applications.

(Final Office Action at 5.) Applicants respectfully disagree.

In order for a reference or combination of references to form the basis for a rejection under § 103(a), the reference or combination of references must teach or suggest all of the elements of the claim. As discussed above in Section II, *Walker* fails to teach each and every limitation of independent claim 1. Moreover, *Treybig* fails to obviate the deficiencies of the *Walker*. Rather, the Examiner merely relied on *Treybig* for its alleged teaching of the step of separately adding the aldehyde or ketone and the amine to water used to form the aqueous acid solution. (See Final Office Action at 5.) Claim 2 depends directly from claim 1 and therefore includes all the limitations of that independent claim. Thus, claim 2 is patentable over the combination of *Walker* and *Treybig*. See 35 U.S.C. § 112 ¶ 4 (2004). Accordingly, for at least these reasons, Applicants respectfully request withdrawal of this rejection with respect to claim 2.

#### IV. Remarks Regarding New Claims

In this response, Applicants have added independent claim 33. Applicants respectfully submit that this claim is allowable over the cited art. Specifically, each of the references cited by the Examiner fail to disclose “a reaction product of an alpha,beta-unsaturated aldehyde with a primary or secondary amine, the alpha,beta-unsaturated aldehyde comprising at least one aldehyde selected from the group consisting of: crotonaldehyde, 2-hexenal, 2-heptenal, 2-octenal, 2-nonenal, 2-decenal, 2-undecenal, 2-dodecenal, 2,4-hexadienal, 2,4-heptadienal, 2,4-octadienal, 2,4-nonadienal, 2,4-decadienal, 2,4-undecadienal, 2,4-dodecadienal, 2,6-dodecadienal, citral, 1-formyl-[2-(2-methylvinyl)]-2-n-octylethylene, dicinnamaldehyde, p-hydroxycinnamaldehyde, p-methylcinnamaldehyde, p-ethylcinnamaldehyde, p-methoxycinnamaldehyde, p-dimethylaminocinnamaldehyde, p-diethylaminocinnamaldehyde, p-nitrocinnamaldehyde, o-nitrocinnamaldehyde, o-allyloxycinnamaldehyde, 4-(3-

propenal)cinnamaldehyde, p-sodium sulfocinnamaldehyde, p-trimethylammoniumcinnamaldehyde sulfate, p-trimethylammoniumcinnamaldehyde o-methylsulfate, p-thiocyanocinnamaldehyde, p-(S-acetyl)thiocinnamaldehyde, p-(S-N,N-dimethylcarbamoylethio)cinnamaldehyde, p-chlorocinnamaldehyde, 5-phenyl-2,4-pentadienal, 7-phenyl-2,4,6-heptatrienal, 5-(p-methoxyphenyl)-2,4-pentadienal, 2,3-diphenylacrolein, 3,3-diphenylacrolein,  $\alpha$ -methylcinnamaldehyde,  $\beta$ -methylcinnamaldehyde,  $\alpha$ -chlorocinnamaldehyde,  $\alpha$ -bromocinnamaldehyde,  $\alpha$ -butylcinnamaldehyde,  $\alpha$ -amylcinnamaldehyde,  $\alpha$ -hexylcinnamaldehyde, 2-(p-methylbenzylidene)decanal,  $\alpha$ -bromo-p-cyanocinnamaldehyde,  $\alpha$ -ethyl-p-methylcinnamaldehyde, p-methyl- $\alpha$ -pentylcinnamaldehyde, 3,4-dimethoxy- $\alpha$ -methylcinnamaldehyde,  $\alpha$ -[(4-methylphenyl)methylene]benzeneacetaldehyde,  $\alpha$ -(hydroxymethylene)-4-methylbenzylacetaldehyde, 4-chloro- $\alpha$ -(hydroxymethylene)benzeneacetaldehyde,  $\alpha$ -nonylidenebenzeneacetaldehyde, 3,7-dimethyl-2,6-octadienal, and a beta-hydroxy aldehyde which dehydrates to form an alpha,beta-unsaturated aldehyde under acidic conditions.” Therefore, Applicants respectfully submit that claim 33 is allowable.

#### V. Request for Rejoinder of Claims

Withdrawn claim 12 depends from independent claim 1. Accordingly, once the Examiner determines that independent claim 1 is allowable, Applicants request rejoinder of claim 12, including examination of the formerly nonelected invention. In addition, because independent claim 1 is in condition for allowance for the reasons stated above, Applicants respectfully submit that claim 12 is also in condition for allowance. Therefore, Applicants request that the Examiner provide an indication of allowance for claim 12.

#### V. No Waiver

All of Applicants’ arguments and amendments are without prejudice or disclaimer. By not responding to statements made by the Examiner, Applicants do not acquiesce to the Examiner’s statements.

### SUMMARY

In light of the above remarks, Applicants submit that the application is now in condition for allowance, and earnestly solicit timely notice of the same. Applicants respectfully request that the Examiner issue an Advisory Action if the Examiner does not find the claims to

be allowable in light of the remarks made herein. Should the Examiner have any questions, comments or suggestions in furtherance of the prosecution of this application, the Examiner is invited to contact the attorney of record by telephone, facsimile, or electronic mail.

Applicants believe that there are no fees due in association with the filing of this Response. However, should the Commissioner deem that any fees are due, including any fees for extensions of time, Applicants respectfully request that the Commissioner accept this as a petition therefor, and direct that any additional fees be charged to the Deposit Account of Baker Botts L.L.P. (No. 02-0383, Order Number 063718.1313).

Respectfully submitted,



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